PB90-160235

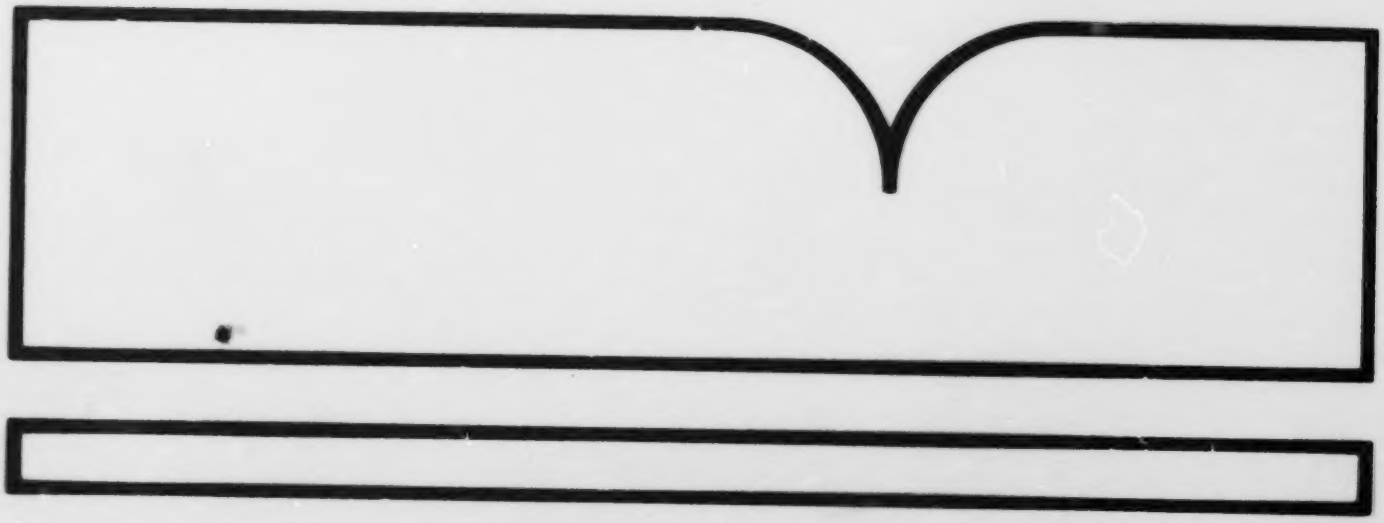
Waste Reduction Assistance Program (WRAP) On-Site Consultation Audit Report: Electroplating Shop

Alaska Health Project, Anchorage

Prepared for:

Environmental Protection Agency, Seattle, WA

7 Apr 88



U.S. Department of Commerce
National Technical Information Service
NTIS

PB90-160235

Alaska Health Project

WASTE REDUCTION ASSISTANCE PROGRAM (WRAP)
ON-SITE CONSULTATION AUDIT REPORT

ELECTROPLATING SHOP

ALASKA HEALTH PROJECT
431 W. 7TH, SUITE 101
ANCHORAGE, AK 99501

April 7, 1988

REPRODUCED BY
U.S. DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL INFORMATION SERVICE
SPRINGFIELD, VA. 22161

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. 002-016 A	2.	3. Recipient's Accession No. PB 90 160235/AS
4. Title and Subtitle: Waste Reduction Assistance Program (WRAP) On-Site Consultation Audit Report: Electroplating Shop			5. Report Date: April 7, 1988
7. Author(s)			6.
			8. Performing Organization Rept. No.
9. Performing Organization Name and Address: Alaska Health Project, 431 W. 7th, Suite 101, Anchorage, AK 99501			10. Project/Task/Work Unit No.
			11. Contract(C) or Grant(G) No. (C) (G)
12. Sponsoring Organization Name and Address: U.S. Environmental Protection Agency, Region 10, 1200 Sixth Avenue, Seattle, Washington 98101			13. Type of Report & Period Covered: environmental audit
			14.

15. Supplementary Notes
This document is included in the Pollution Prevention Information Clearinghouse, operated by Science Applications International Corporation (SAIC) for the U.S. EPA, 8400 Westpark Drive, McLean, Virginia, 22102.

16. Abstract (Limit: 200 words)

This study reports on one Alaskan electroplating shop. The study makes recommendations for the reduction of hazardous waste for this shop and for others throughout the industry, including advice on using a nickel dead rinse, longer drain time for parts, spray rinses, the addition of wetting agents, lowering bath concentrations, materials substitution, bath agitation and misting reduction.

17. Document Analysis a. Descriptors

pollution prevention, materials substitution

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
Release unlimited		24
	20. Security Class (This Page)	22. Price

(See ANSI-Z39.18) See Instructions on Reverse

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

READERS NOTE:

The information contained herein is intended to be general guidance for the facility described in this report and the industry as a whole. It is the product of approximately 6 to 8 hours of on-site consultation. The focus of the report is waste management and waste reduction, not regulatory compliance. Regulatory issues mentioned herein are discussed only insofar as they impinge on management issues related to hazardous waste management and waste reduction, and are not part of a comprehensive discussion about all pertinent regulation requirements. Waste determinations were made from available data, no on-site sampling took place. Managers interested in specific information on hazardous waste regulations should contact the nearest EPA or Department of Environmental Conservation office. Waste reduction measures are described briefly and should be further evaluated and balanced against unique conditions of each specific business.

TABLE OF CONTENTS

		Page(s)
I.	Introduction	1 - 2
	A. Waste Reduction Assistance Program (WRAP) B. Audit Methods	
II.	Shop & Electroplating Process Description	3 - 4
III.	Waste Generation	5 - 7
IV.	Materials Management	8
V.	Waste Reduction Alternatives	9 - 13
	A. Incentives B. Waste Reduction Categories C. Potential Waste Reductions	
VI.	Summary and Conclusion	14
VII.	Bibliography	15
VIII.	Appendix	16

I. Introduction

A. The Waste Reduction Assistance Program (WRAP)

The Waste Reduction Assistance Program is designed to help small businesses reduce industrial waste through educational programs and on-site waste audits. Audit reports focus on the elimination of waste through source reduction and recycling wherever possible. The program is funded by a RCRA 8001 grant awarded by the United States Environmental Protection Agency (EPA) to the Alaska Health Project, a non-profit organization located in Anchorage, Alaska.

After on-site audits are conducted, individual reports are written describing the processes used and wastes produced by the particular business. Each report then recommends methods for reducing these wastes. The identity of the business remains confidential. The audits are intended to be applicable to other similar businesses in Alaska. Audit reports are available to interested parties upon request.

This report is the result of an audit of a small Alaskan electroplating shop. The purpose of the report is to:

1. Identify the wastes produced in an electroplating shop and the processes by which they are generated.

2. Make recommendations for methods to reduce the amount of waste generated.

3. Identify common waste management practices and advise on methods to improve material storage and handling.

4. Analyze the cost benefits of waste reduction strategies recommended.

5. Provide an example to other electroplators and businesses on how to conduct a waste reduction audit.

All recommendations, information, and cost data included in this report are subject to change as they can be effected by changing market conditions, regulatory climate and shop processes. This report is written for a single Alaskan electroplating facility. It offers only general guidance to other electroplating facilities. A multitude of waste reduction options are available to electroplators, this report discusses only those technically and economically feasible for this particular facility.

B. Audit Methods

The audit team included an environmental engineering graduate student intern and an environmental health specialist. The audit had two steps, a preliminary interview with the shop manager and a shop walkthrough. The interview collected the following information:

1. General shop information (size, layout, etc.)

2. Shop processes

3. Material Safety Data Sheets

4. Current waste management practices

During the interview, the audit team also explained the audit process to the shop manager.

In step two, the shop manager and the audit team conducted an inspection of the shop operations and processes. The audit team identified the processes with the potential for generating waste and investigated the shop's waste management practices.

The six hour on-site audit included no environmental monitoring or industrial hygiene sampling. All information provided in this report is based upon the interview, the walkthrough, and a literature review. Waste determinations are based upon the literature, existing laboratory reports, and CERCLA site inspection report. Waste volume figures are based upon estimates made by the generator and the audit team during the walkthrough.

This report provides only general regulatory compliance information. Businesses should contact the Department of Environmental Conservation for more specific regulatory information.

This audit report was prepared by the graduate student intern under the guidance of Alaska Health Project and the University of Alaska School of Engineering.

II. Shop and Electroplating Process Description

The shop audited is a small electroplating company. It is owned, managed and run by a staff of two. The building covers 3000 square feet. The work is mostly piece work, though occasionally large volume orders are done. The majority of the work performed is chrome plating of automobile parts, most often bumpers (approximately 20 to 30 a week). Household items and other miscellaneous pieces are plated also, in addition to a small amount of brass and aluminum plating.

Electroplating is used to prevent corrosion, improve appearance, and improve the electrical properties of metal, rubber and plastic parts. The electroplating process is performed in large tanks containing an electrolyte of the metal salt in water. Two electrodes are immersed in the solution, and a low voltage DC current is applied. The piece to be plated is the cathode, and the metal ions in solution migrate to the work piece and are plated on. Parts to be plated are immersed in a series of cleaning, rinsing and plating baths to produce the final product. Chrome Plating consists of a layer of copper, followed by a layer of nickel, and finally a layer of chrome.

The layout of this shop is shown in **Figure 1.** Work pieces are manually carried from tank to tank; larger shops are typically automated.

The plating processes used in this plant involve many steps. Because chrome plating constitutes the vast majority of the work processed by this shop, the chrome process is outlined below. Refer to Figure 1 while reviewing the process.

1. If preliminary cleaning or stripping is necessary, the part is put into the dechroming tank "J" (sodium hydroxide, one half pound/gallon), in the nickel stripping tank "L" (sulphuric acid), or the spent acid tank "K" (spent 10% hydrochloric acid).

2. The part is then place in the soap wash tank "A".

3. The part is then rinsed in the continuous flow rinse "B".

4. The part is then dipped in the 10% hydrochloric acid tank "C" for 20 seconds.

5. The part is rinsed again in the continuous rinse "B".

6. The part is immersed in the copper plating tank "D" for 35 minutes.

7. The part is then rinsed in the copper dead rinse "E".

8. The part is returned to the continuous flow tank "B"

9. The part is then buffed in the buffing room.

10. The part is then washed in the soap tank "A".

11. This part is again put into the continuous flow rinse "B".

12. The part is returned to the acid bath "C".

13. The part is rinsed in the continuous flow rinse "G".

14. The part is placed in the nickel plating bath "F" for 45 minutes.

15. The part is rinsed in the second continuous flow rinse tank "G".

16. The part is moved to the chrome plating tank "I" for 4 minutes.

17. The part is dipped in the chrome dead rinse "N", and spray rinsed above the dead rinse tank.

18. The part is then dipped in a second dead rinse tank "H", and drip dried above this rinse tank.

Aluminum and brass plating follow a similar series of steps.

* Note - a dead rinse is a rinse having no flow in or out.

The copper and the chromium rinses are "dead rinses," having no flow in or out, and are used to replenish their respective plating baths. Once each week, 40 gallons of copper dead rinse is carried to the copper plating bath and 50 gallons of the chrome dead rinse is carried to chrome bath. This process serves both to replenish the plating baths and to keep the rinses dilute enough to be effective.

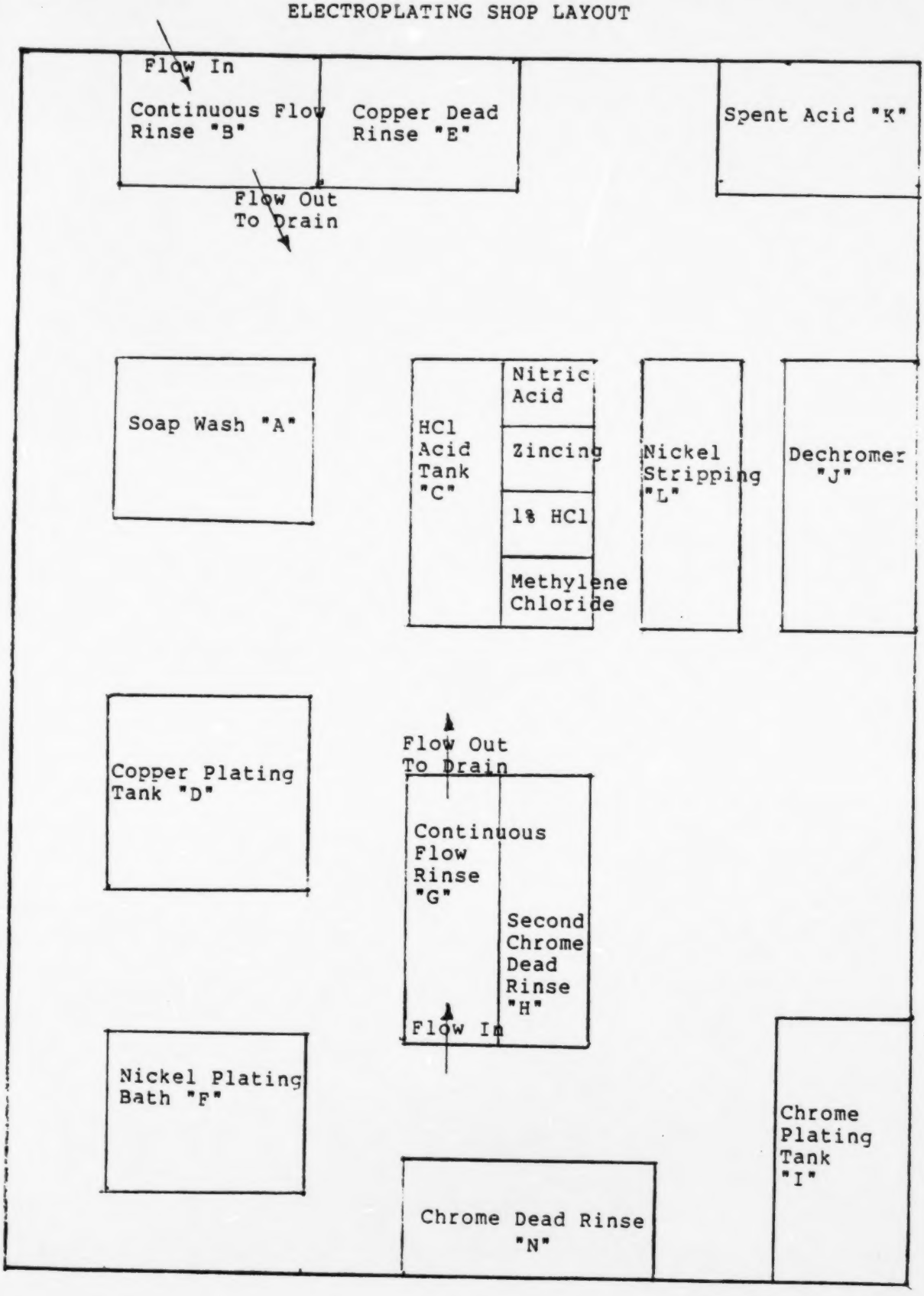
The continuous flow rinse "G" is used as a rinse for the nickel bath. The operator does not use a dead rinse to replenish the nickel bath because it is highly sensitive to contamination.

As needed, water and plating solution can be added to the plating baths to keep them at their proper level and concentration.

The temperature and chemical make-up of each of the plating baths is critical to the electroplating process. The temperatures for each bath are continually monitored. Extreme care is taken to avoid any contamination of the plating baths. A different pair of gloves is used for each metal plating process. Should the copper and nickel baths become contaminated, the bath solutions are purified through filtration.

FIGURE 1

ELECTROPLATING SHOP LAYOUT



III. Waste Generation

The electroplating industry uses many hazardous materials. Heavy metals, corrosive cleaners, and cyanide are commonly used. This shop discharges wastewater containing chromium, nickel, copper, zinc, lead, cadmium, and cyanide (a constituent of the copper plating solution) into the municipal sewer system. Other wastes produced include spent acid and caustic soda (which are neutralized and discharged into the sewer), discarded paper filters (disposed in the municipal landfill), and volatilized plating solutions. With the exception of the volatilized plating solutions and the paper filters, all wastes produced bv this shop are discharged into the municipal sewer.

Two parties have measured the concentrations of wastes being discharged into the municipal sewer. The average values from each set of measurements and the maximum concentration allowed by the Anchorage Water and Wastewater Industrial Wastewater Discharge Permit issued to the plant are shown below:

TABLE 1 (mg/1)

Waste	#1 Average Concentration	#2 Average Concentration	Maximum Limit
Chromium	0.29	5.01	10.0
Copper	0.92	6.57	2.5
Lead	N/A	1.481	0.6
Nickel	2.73	31.63	6.0
Zinc	N/A	2.226	N/A
Cadmium	N/A	0.024	1.0
Cyanide	0.84	2.113	0.3

Using a monthly average flow of 40,000 gallons of wastewater discharge, the average quantity of waste disposed of into the sewer system each month is shown below:

TABLE 2 (in pounds)

Waste	#1 Discharge	#2 Discharge
Chromium	0.10	1.67
Copper	0.30	2.67
Lead	N/A	0.494
Nickel	2.73	10.54
Zinc	N/A	0.742
Cadmium	N/A	0.008
Cyanide	0.28	0.711
Total	Incomplete data	16.36

The wastewater discharged by this facility should meet the limits required by the Municipality of Anchorage Water and Wastewater utility. Table I reveals inconsistent data on the exact concentrations of waste discharged into the sewer system. Consistent and reliable data is needed to accurately identify waste concentrations and to determine the generator's regulatory requirements. It is recommended that the shop manager work with the Anchorage Water and Wastewater Utility to develop a good data base. Moreover, waste reduction recommendations presented in Section V of this report will help reduce the concentrations of metals in the wastewater discharges.

Waste Sources

The sources of waste in the electroplating industry are rinsewater, spent plating solutions and cleaners, drag-out (plating solution that clings to a part after it is removed from the plating bath) and misting (volatilized plating solutions). It should be noted that drag-out from one bath becomes drag-in to the next bath, and can cause bath contamination.

Observations during the plant visit revealed the following conclusions about waste sources:

Rinsewater

Rinsewater is the major source of waste in this shop. Rinse tank "G" flows at an estimated 5 gallons per minute. It serves as a first rinse for nickel plating, collecting most of the drag-out from the nickel tank and discharging directly into the sewer system.

Rinse tank "B" flows at an estimated 1 gallon per minute. It serves as a second rinse for the for nickel and copper plating, and therefore is a likely source of nickel, copper, and cyanide sewer discharge.

The quantity of waste produced by this shop is still quite small when compared to other electroplators. This is likely due to the small volume of work performed and the use of dead rinses to replenish various plating baths. Some shops do not use dead rinses and rinsewaters are treated and discharged into the sewer system.

Spent Plating & Cleaning Solutions

These solutions contribute little to the waste stream of this facility. The shop manager carefully avoids contamination of plating baths and frequently filters them to keep them clean. It is common for sludges to be created in the plating solutions of electroplating operations. These sludges constitute a substantial amount of waste. Through a combination of the processes used, low volume of plating, and filtration technology, this shop avoids the creation of these sludges.

The spent cleaning solutions, hydrochloric acid (tank "C") and the caustic soap cleaner (tank "A"), and caustic soda (tank "J") are neutralized prior to discharge into the sewer (approximately 180 gallons per month).

Drag-out

Drag-out contributes to the waste stream of this facility. Parts removed from plating baths are allowed to drain for approximately 1 or 2 seconds before being carried to the next bath. Thus, a large quantity of drag-out "clings" to the part, drips on the floor, enters the next bath, and ultimately becomes a part of the facility's wastewater discharge. This is supported by the fact that substantial amounts of copper and cyanide are identified in the laboratory reports, even though parts removed from the copper bath are first rinsed in a dead rinse.

Misting

Stains and discoloration on the walls indicate that some misting does occur, but this activity is not expected to contribute substantially to the waste stream.

Paper Filters

Approximately twenty-four 6 inch paper filters are generated every two months.

IV. MATERIALS MANAGEMENT

Precautions should be taken to prevent accidents involving the hazardous materials stored on site. The regulations for the storage of hazardous materials and wastes were written to prevent accidental spills, fires, explosions, and release to the environment. The operator of a site should develop a written contingency plan to deal with an accident involving stored hazardous materials. Such a plan would significantly reduce the potential waste discharge of the shop. Emergency phone numbers should also be clearly posted.

The caustic soap cleaner tank ("A"), copper plating tank ("D"), and the nickel plating tank ("F"), are all located in an 18 inch deep spill protection pit. The chrome plating tank ("I") has a double liner. The other tanks are all single steel tanks, with the exception of small barrels (approximately 40 gallons) containing methylene chloride, 1% hydrochloric acid, zinc plating solution, and nitric acid. When not in use, all the tanks are covered for safety and to prevent spills and evaporation.

A variety of chemicals are stored on site. These include nickel sulfate, sulfuric acid, potassium cyanide, chromic acid, sodium hydroxide, and various plating bath additives. They are stored in the corner of the main work room and in the back buffing room. These materials should all be clearly labeled. Material safety data sheets should be obtained for each of these substances.

Safety equipment includes fire extinguishers, a first aide kit and an eye wash station. The shop has no alarm system.

V. WASTE REDUCTION ALTERNATIVES

A. Incentives

The private sector has many incentives to reduce their generation hazardous and solid wastes, air emissions, wastewater, and other wastes. Some incentives include:

1. High disposal costs: Strict hazardous waste legislation and high liability lead to disposal costs that can reach over $1000.00 per 55-gallon drum.

2. Financial liability: Generators of hazardous wastes are liable for their wastes from their production to their ultimate disposal. This liability includes potential improper handling by the transporter or the disposal facility, as well as any future sudden releases of disposed wastes. By reducing wastes, generators reduce their liability.

3. Public relations: Hazardous waste is now a very visible issue. The public is concerned about the creation of all forms of solid and hazardous waste. Employing waste reduction can better a business' public image.

4. Saving money: Waste reduction can save money for a business and improve efficiency.

5. Protect workers: Waste reduction can reduce worker and community exposures to industrial waste.

B. Waste Reduction Categories

The production of wastes can be reduced in many ways. The best method is to reduce waste at the source in the production process. On-site recycling can also effectively reuse raw materials thereby reducing overall waste generation rates. Wastes that cannot be reduced should be treated on-site to reduce volume and toxicity. As a final option wastes should be sent to a disposal facility.

Waste reduction techniques can be grouped into the following categories:

1. Process Modifications: The use of technology to reduce waste. For example, ion exchange is used by many industries to capture wastes.

2. Improved Plant Operations: Changes in plant operations that decrease wastes. For example, allowing parts a longer drain time to reduce drag-out.

3. Production Process Changes: Utilizing raw materials that will produce less hazardous waste.

4. Recycling and Reuse: Recycling potential hazardous wastes back into the production process. Replenishing a plating bath with rinsewater is an example of this method.

C. Waste Reduction Opportunities

This shop already employs many methods that reduce waste. This is evident by the extremely low level of waste generation the shop has already attained. This shop does an excellent job of recycling the copper and chromium rinses into their respective plating baths. The use of dead rinses proves to be very effective. The contamination control and filtration of the plating baths results in an absence of plating sludge, a major source of waste for most electroplators. Keeping all of the baths covered improves safety and reduces misting.

This shop could improve its hazardous materials management by organizing its materials storage and creating an emergency spill plan. A designated storage area could be created for the chemicals kept on-site. This area could be organized to avoid any chance of dangerous mixing of chemicals. The containers kept in this area should all be clearly labeled. An emergency spill plan could be written to provide for a quick and effective response to an emergency.

There is no shortage of methods of waste reduction for electroplators. On the contrary, the problem for electroplators is to sort through the mass of options to find the most economical and effective methods. This shop is a small operation, and hence, any high technology high cost waste reduction alternative such as ion exchange, membrane exchange, electrolytic recovery, waste stabilization and solidification are impractical. Several low technology alternatives and plant operation changes might be implemented, and together they could have a large effect on waste reduction. These alternatives are described below:

NICKEL DEAD RINSE

A dead rinse could be created for the nickel bath. This would allow a recycling process similar to that already used for the copper and chrome baths. The first rinse nickel bath is currently a continuous flow rinse tank "G", this leads to large amounts of nickel in the sewage effluent. A dead rinse would keep much of this nickel in the plating system, rather than putting it down the drain. The nickel bath is extremely sensitive to contaminants, so a method of filtering the nickel dead rinse prior to its addition to the plating bath would need to be devised. Nickel rinses have been successfully recycled in other plants (Institute For Local Self Reliance).

DRAG-OUT REDUCTION

Drag-out reduction measures will significantly lower the amount of waste discharged. Drag-out could be minimized by the following techniques:

1. Increase Drain Time

Allowing the parts more drain time over the bath. This shop currently allows only one to two seconds of drain time. The plant operator desires to keep the process moving efficiently and wishes to prevent the staining and spalding that extended air contact can cause. However, drain times of 10 seconds and more have been successfully used in other plants, and have cut drag-out bv 67% (MnTAP Report). A drip bar could be installed over the tank, and used to suspend the part over the tank for the required time. Grates could also be installed on the rinse tanks, allowing the part to sit and drain back into the tank.

2. Install Spray Rinses

Using spray rinses directly over the plating baths - this would remove much of the drag-out with a minimum of water, and wash the drag-out directly back into the plating bath. The spray rinses use a small amount of water, and would have only a small effect on bath concentration and temperature (a MnTap study showed a spray rinse producing only 20 gallons in an 8 hour day). To minimize these effects, the first rinse tank could be used as a source water for the spray and the water could be heated prior to spraying. Evaporators could also be used to reduce the water content of the plating bath and thereby compensate for the spray water. It should be noted that spraying creates a humid atmosphere that minimizes the corrosive effects of air contact.

3. Add Wetting Agents

Wetting agents (surfactants) could be added to the plating baths, they have been shown to reduce drag-out by as much as 50%.

4. Lower Plating Bath Concentration

The concentration of the plating baths could be lowered, thus lowering the amount of metal that is dragged out. The concentration of chromium is now 37 ounces per gallon, while concentrations as low as 29 ounces per gallon have been used effectively in other plating shops.

5. Increase Plating Bath Temperature

The temperature of the bath could be increased, lowering the viscosity of the plating solution so that it drains off the part more easily.

6. Improve Removal Techniques

Cup shaped parts could be removed from the bath in the "cup facing down" position to increase drainage of the plating solution.

7. Material Substitution

Less hazardous materials could be substituted for materials currently being used in the process. Trivalent chromium could be substituted for the more toxic hexavalent chromium, though this results in a finish of a different luster. Cyanide compounds can be replaced with less toxic compounds such as zinc chloride and pyro-phosphate copper.

8. Agitate Baths

Plating baths and rinses can be made more efficient, thus requiring less contact time and creating less drag-out, by agitating them mechanically or with bubbles.

9. Reduce Misting

Misting can be reduced through the use of additives or plastic chips that float on the surface of the plating bath. Ventilation hoods could be installed over the baths to further protect the workers. The hoods should be installed so as not to draw evaporative plating solution through the breathing zone of the worker.

The majority of the waste reduction strategies listed above are all low-tech and low cost. The owner plans to empty his sulfuric acid tank and store the acid in the near future. The empty tank could be used as a nickel dead rinse. Drip bars, spray rinses, and evaporators can all be constructed cheaply in house. Wetting agents ($15 per 200 grams), misting reduction additives ($15 per gallon) and trivalent chromium (adds 15% to the operation of the chromium bath) are all readily available and inexpensive as are plastic chips for misting reduction and agitation devices.

VI. SUMMARY AND CONCLUSION

The shop has already taken measures to reduce its waste generation by effectively recycling copper and chrome dead rinse solutions and by preventing the formation of sludge in its plating tanks.

The addition of a nickel dead rinse, longer drain time for parts, spray rinses, and the addition of wetting agents will greatly reduce the wastes generated by this shop. These additions are inexpensive.

Other methods that will promote waste reduction include lowering bath concentrations, materials substitution, bath agitation and misting reduction.

Since the initial site visit, the shop owner has installed a spray bar and a spray rinse over the copper dead rinse.

The audit process helps businesses identify their waste problems and find practical solutions to reduce wastes. The goal of any business is to make a profit. In current times of increasing waste regulations, costs, and liabilities, a waste reduction audit can be a significant money saver.

VII. BIBLIOGRAPHY

1. Burgess, W., Recognition of Health Hazards in Industry, John Wiley and Sons, NY, NY, 1981.

2. Grosse, D. A Review of Alternative Treatment Processes for Metal Bearing Hazardous Waste Streams, EPA Cincinnati, Ohio, 1986.

3. Institute for Local Self Reliance, Proven Profits from Pollution Prevention, Washington, D.C., 1986.

4. Minnesota Technical Assistance Program, (MnTap, Rich Bosshardt), Reducing Drag-out in Copper and Tin/Lead Plating, 1987.

5. Minnesota Technical Assistance Program, (MnTap, Diane Achman), Reducing Chrome Loss from a Chrome Plating Bath, 1987.

6. Pollution Probe Foundation (Monica Campbell, William Glenn, Profit From Pollution Prevention, Toronto, Ontario, 1982.

7. Tryck, Nyman, and Hayes, Cercla Site Inspection Report, Anchorage, Alaska, 1987.

8. University of Pittsburg Applied Research Center, Hazardous Waste Minimization Manual, Pittsburg, PA., 1987.

All resources are available through Alaska Health Project's Small Business Waste Reduction Resource Library.

VIII. APPENDIX

1. EPA letter of audit confidentiality.

2. Synopsis of Small Quantity Generator Regulations.

Appendix A

Synopsis of the Small Quantity Generators Regulations

Facilities producing between 220 and 2200 pounds of hazardous wastes per month are subject to the Small Quantity Generator regulations. These regulations will require waste producing facility to:

1) Identify the hazardous wastes produced.

2) Obtain an EPA identification number.

3) Ship hazardous wastes for treatment, storage, or disposal in EPA approved facilities. The shipment will have to meet the requirements set by the Federal Department of Transportation for hazardous wastes. In addition the shipment will have to be accompanied by a manifest containing the generator's name and address, the shippers name, and the name and address of the receiving facility.

4) The hazardous wastes should be offered, at least every 180 days, to shippers and disposal facilities with an EPA identification number. In Alaska, because there are no EPA certified hazardous waste disposal sites within 200 miles, the wastes can be stored for 270 days. The maximum weight of the wastes being stored, however, cannot exceed 13,200 pounds.

5) Finally, the waste generator should keep a copy of the shipping manifest for three years.

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 SIXTH AVENUE
SEATTLE, WASHINGTON 98101

SEP 23 1986

RECEIVED
OCT 09 1986
WASTE MANAGEMENT BRANCH

REPLY TO
ATTN OF M/S 530

David Wigglesworth
Alaska Health Project
417 W Eighth Avenue
Anchorage, Alaska 99501

Dear Mr. Wigglesworth: David.

This is in reply to your question regarding information required by the Alaska Health Project's small quantity generator study. The purpose of this project is to study general waste management procedures and processes for specific small quantity generator categories. We hope to identify common current waste practices that can be better managed, and/or methods where waste generation can be minimized.

Because we wish the study results and recomendations to be as widely applicable to other generators as possible, we would like to obtain information which characterizes the representative generators you are studying. We do not feel any facility-specific identifiers will be necessary, but we would like any information on the facility type, process, size of operation, and/or any other information which would have bearing on the usefulness or extrapolation of the data to other generators, both in and outside of Alaska.

If you have further questions, please feel free to contact me.

Sincerely,

Joan

Joan Cabreza
RCRA Program Development

18

30